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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/566,478	07/25/2006	Shinichi Nagata	80288 (302748)	5102

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EXAMINER	
VALONE, THOMAS F	

ART UNIT	PAPER NUMBER
2831	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,478	NAGATA ET AL.	
	Examiner	Art Unit	
	THOMAS F. VALONE	2831	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-10 and 12-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-10 and 12-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 January 2006* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/26/08*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Prosecution on the merits of this application is reopened on claims 1, 3-10, 12-18 considered unpatentable for the reasons indicated below:

The Information Disclosure Statement (IDS) submitted by the applicant before the issue fee was paid contains subject matter that reads on the amended claims.

2. Applicant is advised that the Notice of Allowance mailed 12/14/07 is vacated. If the issue fee has already been paid, applicant may request a refund or request that the fee be credited to a deposit account. However, applicant may wait until the application is either found allowable or held abandoned. If allowed, upon receipt of a new Notice of Allowance, applicant may request that the previously submitted issue fee be applied. If abandoned, applicant may request refund or credit to a specified Deposit Account.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the proximity sensors and fluctuation detecting unit, in claims 15 and 18, as well as the save mechanism in claim 16, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 6, 9, 10 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki (4,297,874), Shimizu (4,030,051), Osaki (4,801,862) and Hoppe (IEEE Trans. Microwave Theory), all of record.

Regarding claims 1, 6, and 9, Sasaki teaches a microwave cavity resonator device or method for measuring moisture content, with a slit in which a specimen is disposed being placed in a manner so as to cross the resonator portion (Fig. 2), with a measuring frequency, used to determine moisture content based on a difference in resonance peak level between the cases when the specimen is not present in the slit and when it is present in the slit (col. 3, 30-39). Sasaki further teaches a resonator portion (cavity resonator 11, Fig. 2) since both ends are closed and traveling wave portions (16, 19, Fig. 2).

Sasaki does not teach two circular-holed iris plates which are arranged perpendicular to and spaced along the tube axis at mid-points of a wave guide, a portion between the iris plates forming a resonator portion and the outside of each of the iris plates forming traveling wave portions as in claims 1 and 6, or the division of peak values by frequency values. Also, Sasaki does not teach the traveling wave portions of the microwave cavity resonator being adjacent to iris plates but at each end of the resonant portion, where his sweep oscillator (17, Fig. 2) and intensity receiver (20, Fig. 2) are connected, as in claim 9.

Shimizu from the same field of endeavor, teaches two single-holed iris plates which are arranged perpendicular to and spaced along a tube axis at mid-points of a wave guide, a portion between the iris plates forming a resonator portion and the outside of each of the iris plates forming traveling wave portions (Fig. 1). As to the predetermined range between 1 to 25 GHz, it is inherent to microwaves to operate in

this range, because the resonant cavity size is half a wavelength, as suggested by Shimizu (col. 1, line 40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included Shimizu's iris plate design, which maximizes coupling to the specimen in the center, with a coaxial resonator portion separate from the traveling wave portion, setting a measuring frequency in a range between 1 and 25 GHz, as in claims 1 and 6 as well as to have the traveling wave portions, both sweep oscillator connection and intensity receiver connection, of the microwave cavity resonator being adjacent to Shimizu's iris plates, as in claim 9, because they are already at each end of Sasaki's resonant portion, which already includes a traveling wave portion separate from the resonator portion, and in order to maximize coupling to the specimen being tested.

Sasaki and Shimizu (S-S) does not teach two circular-holed iris plates which are arranged perpendicular to and spaced along the tube axis at mid-points of a wave guide or the division of peak values by frequency values for the specimen.

Osaki, from the same field of endeavor, teaches two circular-holed iris plates which are arranged perpendicular to and spaced along the tube axis at mid-points of a wave guide (Fig. 2 and Fig. 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included Osaki's iris plate design in the moisture detector of S-S, for the benefit of rotatably accommodating the iris holder about the axis, making it independent of rotation, as suggested by Osaki (col. 2, line 65-68).

Sasaki, Shimizu and Osaki (S-S-O) does not teach the division of peak values by frequency values for the specimen during its presence and absence.

Hoppe, from the same field of endeavor, teaches the water content of a specimen can be "simply" found by taking the ratio of the differentials $\Delta f/\Delta P$ (p. 1451, col. 1). Hoppe further identifies the Δf and ΔP subtractions as the difference between the empty cavity and the insertion of the specimen (p. 1451, col. 1). A standard inversion of $\Delta f/\Delta P$ creates the claimed ratio $\Delta P/\Delta f$ which has the same or equivalent import, to one of ordinary skill. It is also noted, that the claimed "difference in resonance peak levels" is interpreted as the "ΔP" value, in light of the instant specification (instant disclosure, p. 22, line 25-30 and Fig. 15). Therefore, the claimed "difference in resonance peak levels" which is identified as differential "ΔP" values, is broadly interpreted to be either voltage or power levels.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included a division ratio of resonance peak values and resonant frequency values between the presence and absence of a specimen as taught by Hoppe in the S-S-O method of measuring moisture content, so as to provide an "unambiguous function" of water or moisture content as suggested by Hoppe (p. 1451, col. 1).

As to claims 10 and 17, Sasaki teaches a one-sided flange (12_3, 13_3, Fig. 2 and col. 2, line 50) with the coaxial wave guide converter for the oscillator and the receiver (17, 20, Fig. 2) as in claim 10. Furthermore, applicant admits that wave guide converters

with one-sided flanges are "commercially available" and "easily achieved" (p. 13, line 21).

6. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki, Shimizu, Osaki and Hoppe (S-S-O-H), as applied to claims 1, 6, 9, 10 and 17 above, and further in view of Merrill (5,368,924).

The teachings of S-S-O-H are reviewed above.

S-S-O-H does not include a specimen bearing a plurality of coat layers and making the measurement with and without the outermost coat layer.

Merrill teaches a coated glass fabric that is moisture resistant (col. 1, line 35-55) which is composed of a plurality of coated layers (col. 3, line 1-10 and first to fifth coatings, col. 3, line 50-68 to col. 4, line 1-20). Merrill further indicates the sheet-like fabric is used in a microwave environment because of its non-interference capability (col. 1, line 35-40).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included Merrill's sheet-like material bearing a plurality of coat layers laminated on the surface just before and just after application of the subsequent outermost layer in a S-S-O-H microwave cavity resonator to measure its moisture content and confirm that any moisture has been evaporated (Merrill, col. 3, line 9).

7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki, Shimizu, Osaki and Hoppe (S-S-O-H), as applied to claims 1, 6, 9, 10 and 17 above, and further in view of Dammig (6,983,516).

The teachings of S-S-O-H are reviewed above.

S-S-O-H does not include a consideration for temperature such as a temperature dependency value storage unit for resonant peak level storage, a temperature sensor, or a correction means that corrects the resonance peak value based on the detected temperature from the sensor.

Dammig teaches that the effect of temperature on microwave measurements can falsify the results (col. 4, line 64-67). Dammig further teaches using a temperature sensor (col. 5, line 5) and using stored temperature dependency curves to compensate for the calculated moisture content to calibrate the frequency shift of the resonant peak (col. 5, line 45-55 and col. 6, line 20-40). Dammig also includes a correction means (microprocessor, col. 6, line 52) that corrects the resonant peak measurement (col. 5, line 15-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included in the S-S-O-H resonant cavity moisture measurement, a temperature dependency value storage unit for resonant peak level storage, a temperature sensor, or a correction means that corrects the resonance peak value based on the detected temperature from the sensor, as taught by Dammig for the benefit of compensating for the effect of temperature, as suggested by Dammig (col. 8, line 57-65).

8. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki, Shimizu, Osaki and Hoppe (S-S-O-H), as applied to claims 1, 6, 9, 10 and 17 above, and further in view of Kich (4,677,403) of record.

The teachings of S-S-O-H are reviewed above.

S-S-O-H does not include a consideration for small millimeter sized iris openings.

Kich discloses a microwave cavity resonator comprising an iris 22 which divides a waveguide body into a pair of cavities 12a, 12b (Fig. 1, 2). The iris 22 also has a 1.57 mm opening which is a small millimeter size.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included an iris opening in the range of 1 – 20 mm as taught by Kich in the S-S-O-H device, for the benefit of exhibiting two selected resonant frequencies, as suggested by Kich (col. 3, line 1-13).

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki, Shimizu, Osaki and Hoppe (S-S-O-H), as applied to claims 1, 6, 9, 10 and 17 above, and further in view of Nagata (6,496,018) of record.

The teachings of S-S-O-H are reviewed above.

S-S-O-H does not include a consideration for the TE 101, 102, 103... modes or a maximum valued of the electric field vector.

Nagata from the same field of endeavor teaches a microwave cavity resonator 6 (Fig. 1) for measuring the dielectric constant comprising sample 10 provided in slit 8.

The constant is measured with and without the sample being present. Nagata also discloses forming a TE mode as a resonant mode (Fig. 5A).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included TE101, 102, 103... modes or a maximum valued of the electric field vector, in the S-S-O-H system, based on the suggestion of Nagata, for the benefit of exposing the sample to the highest intensity microwave energy.

10. Claims 12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki, Shimizu, Osaki and Hoppe (S-S-O-H), as applied to claims 1, 6, 9, 10 and 17 above, and further in view of Maeno (4,890,054) of record.

Regarding claim 12, the teachings of S-S-O-H are reviewed above.

S-S-O-H does not include continuous supply of the specimen to the slit, or the data processing device comprising a storage unit that stores a resonant peak level value for comparison of the presence and absence of the specimen for continuous moisture measurement.

Maeno teaches continuous supply of the specimen to the slit, and the data processing device comprising a storage unit (CPU 18, col. 6, line 20) that stores a resonant peak level value for comparison of the presence and absence of the specimen for continuous moisture measurement (production process being measured in an on-line manner, col. 4, line 9-10).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included Maeno's continuous supply of the specimen and

the data processing device for computerized continuous measurement with peak value comparison in the resonant cavity moisture measurement of the S-S-O-H system, in order to provide a computerized continuous production process, as suggested by Maeno.

Regarding claim 14, Sasaki includes a guide with a shape for guiding the specimen into the slit and attached to the end portion of the slit side on the outside face of the waveguide, which appears to be the E face of the cavity resonator (12_2, 13_2, Fig. 2).

11. Claims 13, 15, 16, 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sasaki, Shimizu, Osaki, Hoppe and Maeno (S-S-O-H-M) as applied to claims 12 and 14 above, and further in view of Dammig (6,983,516).

Regarding claim 13, the teachings of S-O-S-H-M are reviewed above.

S-S-O-H-M does not include a temperature dependency value storage unit for resonant peak level storage, a temperature sensor, or a correction means that corrects the resonance peak value based on the detected temperature from the sensor.

Dammig teaches that the effect of temperature on microwave measurements can falsify the results (col. 4, line 64-67). Dammig further teaches using a temperature sensor (col. 5, line 5) and using stored temperature dependency curves to compensate for the calculated moisture content to calibrate the frequency shift of the resonant peak (col. 5, line 45-55 and col. 6, line 20-40). Dammig also includes a correction means

(microprocessor, col. 6, line 52) that corrects the resonant peak measurement (col. 5, line 15-20).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included in the S-S-O-H-M resonant cavity moisture measurement, a temperature dependency value storage unit for resonant peak level storage, a temperature sensor, or a correction means that corrects the resonance peak value based on the detected temperature from the sensor, as taught by Dammig for the benefit of compensating for the effect of temperature, as suggested by Dammig (col. 8, line 57-65).

Regarding claims 15, 16 and 18, the teachings of S-O-S-H-M are reviewed above.

S-S-O-H-M does not include a proximity sensor or a fluctuation detecting unit as in claims 15, 18 nor a save mechanism as in claim 16.

Dammig, from the same field of endeavor, teaches a proximity sensor (microwave sensors 30 and 3, Fig. 1 and col. 8, line 16 and col. 7, line 44) which emits voltage signals corresponding to thickness and a fluctuation detecting unit (evaluation units 31 and 4, Fig. 1 and col. 8, line 36 and col. 7, line 45) which converts the proximity sensor's signals into voltage values representing the "thickness fluctuations" (col. 7, line 46), as in claims 15, 18. Dammig further teaches a save mechanism that keeps away the specimen from the resonator when a fluctuation width exceeds a predetermined reference value (control unit 10, col. 8, line 20-42), which controls an actuating magnitude (speed) and a guiding magnitude (thickness), compared to a "target value"

thickness (col. 8, line 22). As far as the specific programming of the save mechanism claimed in claim 16, it is noted that a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987) While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the Dammig proximity sensor, save mechanism and fluctuation detecting unit in the S-S-O-H-M moisture content measuring device, for the benefit of providing a leveled thickness for the specimen, as suggested by Dammig (col. 8, line 25-30).

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Sargent teaches a recording microwave hygrometer; Young teaches a microwave susceptor with a plurality of layers; Revesz teaches a microwave content analyzer that concurrently measures temperature; Cutmore teaches a microwave detector that determines phase shift; Chase teaches a microwave moisture

sensor with a proximity sensor; Kraszewski teaches a microwave moisture instrumentation for sheet materials.

13. Applicant's submission of an information disclosure statement under 37 CFR 1.97(c) with the fee set forth in 37 CFR 1.17(p) on 2/26/08 prompted the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 609.04(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THOMAS F. VALONE whose telephone number is (571)272-8896. The examiner can normally be reached on Tu-W-Th, 10:30-7:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez can be reached on 571-272-2245. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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